CHARLES DARWIN UNIVERSITY

Family Name	
Given Names	
Student Number	
Teaching Period	Semester 1, 2017

FINAL EXAMINATION	**DURATION**
SPE311 – Advanced Studies in Exercise and Sport Science 1	Reading Time: **10** minutes Writing Time: **180** minutes

INSTRUCTIONS TO CANDIDATES

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

No dictionaries are permitted

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 16 Page Book 1 x Scrap Paper Faculty/School Multiple Choice Answer Sheet Formula Sheet/s

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Section B

Short Answer Questions

Some questions are made up of more than one component.

Answer **all** 10 questions and **all** components. Total marks for this section: 40 marks

The questions are each worth varying amounts of marks. Marks for each question are indicated.

This section should be answered in the Answer Booklet provided.

Suggested time allocation for Section B: 65 minutes

Question 41

Before launching into wholesale modifications with an athlete, a trainer must carefully consider several factors. Relative to Assessment and Modification, list two factors

(Marks 2)

Question 42

1) List a sport where open-ended optimisation factors contribute to sport performance, and

2) explain why?

(Marks 2)

Question 43

High-speed movements are the result of two sequential actions. Name and briefly describe what these two actions are.

(Marks 4)

Question 44

Data collection is valuable to assist performance evaluation. A relationship has often been established between the velocity of release and the distance thrown of any implement. An example has been shown for javelin (Figure 1).

- Use the R^2 value and the regression equation to explain the relationship between release velocity and distance.
- Additionally, what does the R^2 value represent in terms of statistics?

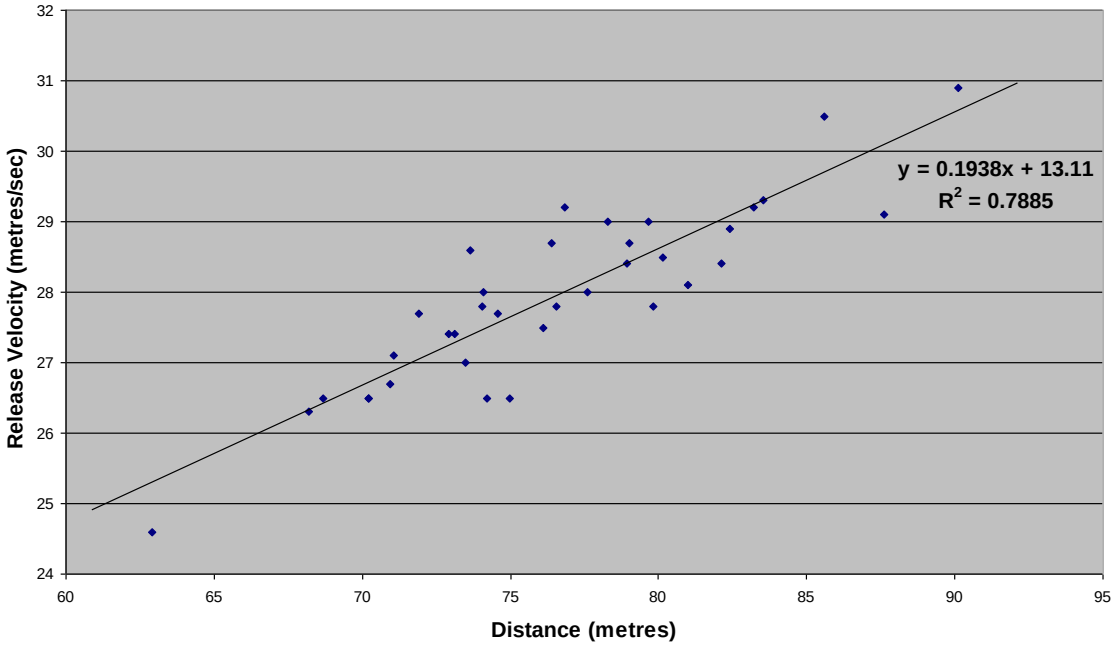

Figure 1. Relationship between release velocity and measured distance of javelin flight (Ackland et al 2009).

(Marks 5)

Question 45

Identify which human muscle fibre types enhance the production of force, torque, power and speed and explain why?

(Marks 2)

Question 46

Muscle stiffness has important implications to sporting activities in many ways. The effectiveness of muscle stiffness can be impacted on by several variables. Specifically: strength training; plyometric and technique training; heavy strength training; and training involving eccentric loading. Choose two (2) variables and briefly discuss how they are reported to affect muscle stiffness.

(Marks 4)

Question 47

Stretching techniques can be classified as either passive or active. Identify and briefly explain the difference between passive and active stretching.

(Marks 2)

Question 48

There are five elements considered important for talent identification programs. List and explain the five elements in the appropriate order to identify athletic potential and talented athletes.

(Marks 5)

Question 49

Explain the advantages and disadvantages of qualitative and quantitative analysis in biomechanics and support your answers with examples from exercise and sport.

(Marks 4)

Question 50

In lectures and laboratories we discussed the methods and steps required to develop predictive mathematical biomechanical models.

1. Use that information to describe the setup and the methods you would use to develop a mathematical biomechanical model for running events. Be sure to:
    a. Discuss how you would incorporate the different event distances of 100 m, 400 m, 800 m, and 1600 m.
    b. Define the dependent and independent variables.

(6 marks)

2. Additionally, based on findings presented in the labs and lectures describe a testable hypothesis as related to the main concepts discussed in SPE311 such as strength, power, speed, and force.

(2 marks)

3. If the hypothesis was tested and was supported by the findings, what implications does this have about how the main variables relate to the running events?

(2 marks)

(Total Marks 10)

This is the end of Section B

Total 40 Marks.

Please ensure that you have written your name and student number on your examination sheet and answer booklet.

Section C
Extended Answer Questions

Answer **both** questions 51 **and** 52 and choose to answer **either** 53 **or** 54.

Total marks for this section: 40 marks

The questions are each worth varying amounts of marks. Marks for each question are indicated.

This section should be answered in the Answer Booklet provided.

Suggested time allocation for Section C: 70 minutes

Question 51

Coaches, especially at elite levels, should determine which aspect of performance needs to be focused on to improve their athletes' performance. Their aim is to modify a variable in order for athletes to reach their highest levels of achievement. One method is to use 'The Assessment and Modification Model' (Figure 2).

Select a sport and explain how the model below can be applied to enhance athlete performance. Be specific and use diagrams if desired.

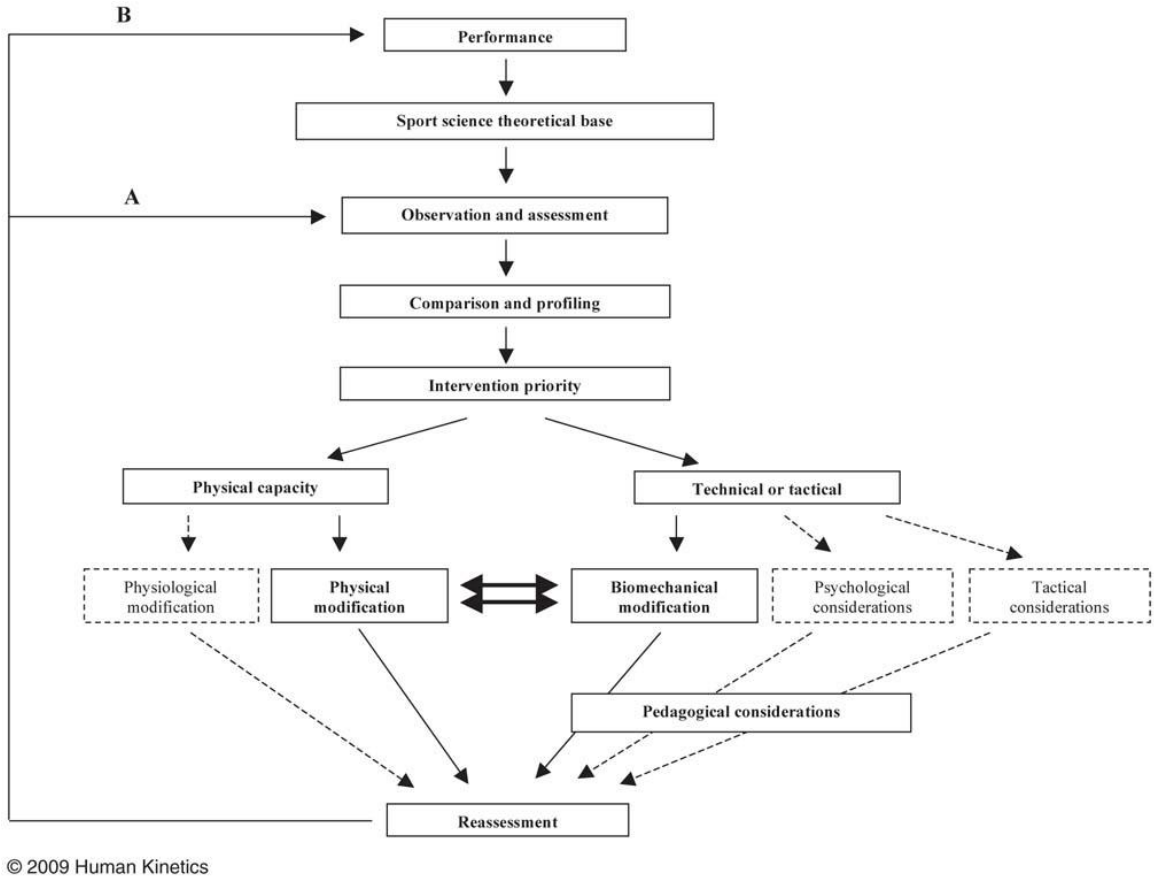

Figure 2. The Assessment and Modification Model (Ackland et al 2009).

(Marks 10)

Question 52

There are known cases where the talent identification process has identified an athlete in one sport as a possible elite performer in an alternative sport. Place yourself in the role of a talent identifier; here you are to identify and discuss one of these possible scenarios.

- Describe the scenario:
    - Choose the initial sport where you first observed the athlete
        - Describe the athlete's particular skills and abilities as well as their initial somatype (specify the somatype according to Figure 3).
    - Describe which sport you would believe would better fit the athlete's talents. Provide the reasons why you chose the alternative sport. Ensure to consider:
        - Their skills and abilities as well as their ability to modify their somatotype .
- Design an exercise program to transition that athlete from the original sport to the alternative sport you described.
    - Provide reason for the different components of the exercise program (e.g. types of exercises, recovery, scheduling).
    - Describe how you would target training methods to transition the athlete's somatotype to suit the second sport. Specify the target somatype according to Figure 3.
    - Additionally, what technology would you use and why would you use it to assess the progression of the athlete's transition.

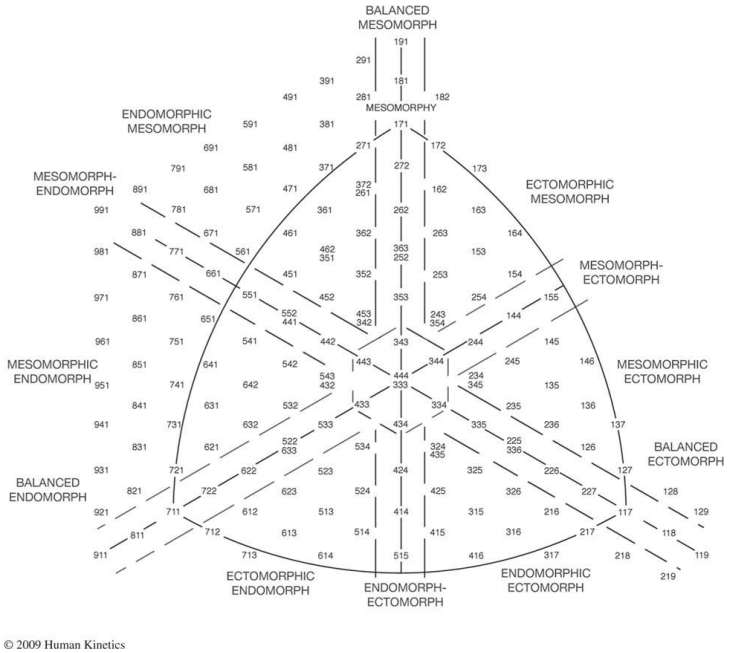

Figure 3. Somatotype categories (Ackland et al 2009).

(Marks 20)

Question 53

Sports instrumentation and technology have been applied to measure “force”, “torque”, “strength” and “power”. Based on your lectures, your textbook, laboratories and research, explain:

- How each can be measured;
- How being able to measure this information can be used by a coach;
- How they can be used to predict performance;
- What units of measurement are relevant to each.

(Marks 10)

Question 54

Image analysis via video recording and motion analysis systems and other technologies are now used frequently in exercise and sport science to provide research data, coaching data, and visual feedback to athletes. These analyses can be 2-dimensional (2D) or 3-dimensional (3D).

1. Under what situations would you use these different technologies for biomechanical analyses?
2. For each technology, provide a specific sporting example which shows:
    a. the benefit
    b. the limitation of each technology.

(Marks 10)

This is the end of Section C

Total 40 Marks.

Please ensure that you have written your name and student number on your examination sheet and answer booklet.